Listing of the Claims

1. (Previously Presented) A magnetic field gradient coil for a short-bore magnetic resonance imaging scanner, the gradient coil comprising:

upper and lower magnetic field gradient coil windings that define a subject-receiving bore and which generate transverse magnetic field gradients imposed on an associated static magnetic field generally oriented in a longitudinal direction through the bore, the upper gradient coil winding having an arcuate curvature transverse to the longitudinal direction and a longitudinal length in the longitudinal direction that is smaller than a longitudinal length of the lower gradient coil winding.

2. (Previously Presented) The gradient coil as set forth in claim **1**, further including:

a coil support including an upper section supporting the upper magnetic field gradient coil winding and a lower section supporting the lower magnetic field gradient coil winding.

3. (Previously Presented) The gradient coil as set forth in claim **2**, wherein the upper and lower magnetic field gradient coil windings include:

primary coil windings disposed on coil bore-defining surfaces of both the upper and lower sections of the coils support; and

shield coil windings disposed on outer surfaces of both the upper and lower sections of the coils support.

4. (Previously Presented) The gradient coil as set forth in claim **3**, further comprising:

connecting conductors extending across an edge of the lower section between the coil bore-defining surface and the outer surface, the connecting conductors electrically connecting the primary and shield coil windings.

5. (Previously Presented) The gradient coil as set forth in claim **1**, wherein:

the arcuate curvature of the upper gradient coil windings lies generally along a portion of a circular or oval cross-section; and

the lower gradient coil windings include primary windings that are substantially planar compared with the arcuate curvature of the upper gradient coil windings.

6. (Previously Presented) The gradient coil as set forth in claim **5**, wherein the lower gradient coil windings further include

shield coil windings lying generally along an arcuate curvature matching the arcuate curvature of the upper coil windings such that the upper gradient coil windings and the shield coil windings of the lower gradient coil windings have one of a circular cross-section and an oval cross-section.

7. (Previously Presented) The gradient coil as set forth in claim **6**, wherein the upper coil windings further include:

primary coil windings and shield coil windings each defining curved surfaces having the arcuate curvature, the defined curved surfaces being spaced apart a separation distance transverse to the longitudinal direction;

connecting conductors disposed at longitudinal ends of the upper coil windings and electrically connecting the primary coil windings and the shield coil windings by spanning the separation distance along a flared annular connecting surface having an angle other than 90^{o} respective to the longitudinal direction.

8. (Previously Presented) The gradient coil as set forth in claim **1**, wherein the longitudinal length of the upper gradient coil windings is about the same as or less than a dimension of the coil bore transverse to the longitudinal direction.

9. (Previously Presented) The gradient coil as set forth in claim **8**, wherein a ratio of the longitudinal length of the upper gradient coil windings to the dimension of the coil bore transverse to the longitudinal direction is less than or about 0.7.

10. (Previously Presented) The gradient coil as set forth in claim **1**, wherein the magnetic field gradient coil windings include:

a first sub-set of the windings that when energized produce a first magnetic field gradient oriented transverse to the longitudinal direction and parallel to a plane of bilateral symmetry of the gradient coil windings; and

a second sub-set of the windings that when energized produce a second magnetic field gradient oriented transverse to the longitudinal direction and transverse to the plane of bilateral symmetry of the gradient coil windings.

11. (Previously Presented) The gradient coil as set forth in claim **10**, wherein the first magnetic field gradient has a zero-field point displaced toward the upper gradient coil winding relative to an imaging volume that is surrounded by the gradient coil.

12. (Previously Presented) The gradient coil as set forth in claim **1**, wherein the magnetic field gradient coil windings include:

a first sub-set of the windings that when energized produce a magnetic field gradient in a first direction oriented transverse to the longitudinal direction and at a 45° angle to a plane of bilateral symmetry of the gradient coil windings; and

a second sub-set of the windings that when energized produce a magnetic field gradient in a second direction transverse to the longitudinal direction and transverse to the first direction.

13. (Previously Presented) A magnetic resonance imaging scanner comprising:

a housing having: (i) an imaging volume imaged by the scanner and (ii) an imaging subject support section disposed below the imaging volume, the imaging subject support section extending beyond a length of a magnet bore;

a radio frequency coil arranged to inject a radio frequency signal into the imaging volume; and

a magnetic field gradient coil including a lower section disposed in the imaging subject support section of the housing and an upper section that together with the lower section define a coil bore containing the imaging volume, the upper section having an arcuate curvature and coil windings spanning a first length, the lower section having coil windings spanning a second length greater than the first length.

14. (Previously Presented) The imaging scanner as set forth in claim **13**, wherein the coil windings of the magnetic field gradient coil include:

a first set of windings that when energized produce a vertical magnetic field gradient imposed on an associated generally horizontal magnetic field at least in the imaging volume.

15. (Previously Presented) The imaging scanner as set forth in claim **14**, wherein the vertical magnetic field gradient has a zero-field point displaced vertically upward relative to the imaging volume.

16. (Previously Presented) The imaging scanner as set forth in claim **14**, wherein the magnetic field gradient coil windings further include:

a second set of windings that when energized produce a horizontal magnetic field gradient imposed on the associated generally horizontal magnetic field at least in the imaging volume.

17. (Previously Presented) The imaging scanner as set forth in claim **13**, wherein the magnetic field gradient coil windings when energized produce one or more magnetic field gradients imposed on an associated generally horizontal magnetic field at least in the imaging volume, the magnetic field gradient coil windings including at least:

a first set of windings that when energized produce a first magnetic field gradient oriented at a 45° angle to the horizontal; and

a second set of windings that when energized produce a second magnetic field gradient oriented at a 45° angle to the horizontal and oriented transverse to the first magnetic field gradient.

18. (Previously Presented) The imaging scanner as set forth in claim **13**, wherein the second length spanned by coil windings of the lower section is greater than the bore length.

19. (Previously Presented) The imaging scanner as set forth in claim **13**, wherein the radio frequency coil includes:

a generally planar lower section disposed in the imaging subject support section of the housing; and

an arcuate upper section that together with the lower section define a radio frequency coil bore contain the imaging volume.

20. (Cancelled) A method of magnetic resonance imaging, the method comprising:

generating a main magnetic field through a subject receiving bore;

generating magnetic field gradients across the bore with a combination of (i) upper gradient coils that have a first longitudinal length shorter than a diameter of the bore and (ii) lower gradient coils that have a second longitudinal length longer than the diameter of the bore.